

REMARKS

In the Office Action of August 9, 2007, claims 1-24 were rejected under 35 U.S.C. 101 for failing to recite a practical application of an idea resulting in a useful, concrete and tangible result. Further, claims 1, 2, 7, 8, 10-13, 15, 18 and 19 were rejected under 35 U.S.C. 102(a) as anticipated by Dacorogna et al., "The Distribution of Extremal Foreign Exchange Rate Returns in Extremely Large Data Sets" (hereinafter Dacorogna 1995). Claims 3-6, 9, 14, 16, 17 and 20-24 were indicated to be allowable if rewritten in independent form and if the § 101 rejection were overcome.

Applicants wish to thank the Examiner for the indication that claims 3-6, 9, 14, 16, 17 and 20-24 are novel and unobvious.

Applicant's attorney would like to thank Examiners Elda Milef and Jay Kremer for the courtesy of a telephone interview at which agreement was reached on a number of issues as described below.

As the Examiner is aware, applicants' invention is directed to methods of filtering time series data by testing for certain errors. A specific practical application of applicants' claimed methods as described at paragraphs 0002 and 0003 on page 1 of the specification is in the filtering of time series financial data such as a sequence of quotes for a financial instrument. The errors tested for include decimal error, scaling error, domain error, a monotonic series of quotes and a long series of quotes.

The nature of these errors is described in the specification. The testing of decimal errors is described in paragraphs 0323-0344 of the published application (page 44 to 48 of the specification). As explained in paragraph 0324, a decimal error can occur when cache memories are updated by partial updates of varying length rather than full refreshment of data. In this situation, subsequent partial update messages may assume that the cache data contains a decimal digit of a certain value established by a message that has been lost when, in fact, the cache contains a different decimal digit established by an earlier message. If a partial update message is lost, the portion remaining in the cache may no longer be correct and subsequent quotes may be in error. Such errors are called decimal errors in the specification.

For example, as described in paragraph 0325, assume a correct quote 1.5205/1.5215 where the first term is the bid price and the second term the ask price is stored in the cache in the form 1.5205/15. This price is then updated by the message "198/08" which reflects a new quote

1.5198/1.5208 but the message is lost so that the previous quote remains in the cache. If a new message “95/05” is then sent with the intention of changing the quote stored in cache to 1.5195/05, it will instead change the stored quote to 1.5295/05 since the last quote stored in cache was 1.5205/15.

The testing for decimal errors is described in paragraphs 0327 to 0344. These steps include testing for a value change between successive quotes that is close to a power of ten (paragraph 0328), testing the time interval between successive quotes (paragraph 0329), testing the validity of a corrected quoted (paragraph 0330), comparing the credibility of a corrected quote with the credibility of the original quote (paragraph 0331), and testing if the bad decimal digit remains the same throughout the decimal error (paragraph 0332).

Scaling errors are described at paragraphs 0345 to 0357 (pages 48 to 50 of the specification). These errors are changes in the scale of a quote by a constant factor relative to prior quotes. These might arise in the event of a revaluation of currency, a stock split or a change in quoting practices.

Applicants’ process tests for scaling errors by testing for substantial changes between a new quote and a previous quote as detailed in paragraph 0348. In particular, in the embodiment described in paragraph 0348 the ratio of the current quote to the previous quote is tested to see if it falls between the square roots of 0.1 and 10. (The greater than sign at line 6 of paragraph 0348 should be a less than sign as will be evident on a moment’s consideration and as is confirmed by the correct use of the less than sign in the next to last line of paragraph 0348.) If the ratio does not fall within these bounds, the value of the current quote is increased by the power of 10 that causes it to fall within these bounds. This power of 10 provides a new scaling factor.

Domain errors are described at paragraph 0284 of the published application (page 40, line 15 of the specification as filed) which states: “A domain error: an illegal level p of the filtered variable, i.e., $p < P_{\min}$ (as opposed to a merely implausible level).” Examples of domain errors in the case of bid-ask quotes are identified in paragraphs 0287, 0288, 0289 and 0292: $p_{\text{bid}} < p_{\min}$, $p_{\text{ask}} < p_{\min}$, $p_{\text{ask}} < p_{\text{bid}}$, $p_{\text{ask}} \leq p_{\text{bid}}$. To understand the nature of the first two of these errors, it is necessary to realize that p_{\min} is the lower limit of the allowed domain of quotes as set forth in paragraph 0276. Thus, there is a domain error if a bid, p_{bid} , or an ask, p_{ask} is less than this lower limit. With respect to the last two examples of domain errors, since the bid should be less than

the asking price, there is a domain error if $p_{ask} < p_{bid}$ or $p_{ask} \leq p_{bid}$. As indicated in paragraph 0285, domain error quotes are rejected.

A monotonic series of quotes is a series of quotes that rise steadily or fall steadily. Such a series is sometimes inserted in the time series intentionally as described at paragraph 0379 to 0398 of the application (pages 52 to 55 of the specification).

A repeated series of quotes is a series of identical quotes. Such a series is sometimes inserted intentionally in the time series as described at paragraph 0399 to 0419 (pages 55 to 58 of the specification).

Claim 1 has been amended to recite the step of rejecting an item of data that fails the testing for decimal error, scaling error, domain error and credibility. Claim 11 has been amended to recite the step of rejecting an item of data that fails the testing for decimal error and credibility. This language is supported, for example, by paragraph 0058 of the published text of the application and by FIG. 3. Paragraph 0058 states that the result of the filtering process can be an output stream of only good data or an annotation that indicates the filter's evaluation of the data. See, for example, the right hand column of FIG. 3.

Applicant respectfully submits that claims 1 and 11 specify a useful, concrete and tangible result in that they specify the output of a data filtering process: the rejection of data that fails the various testing steps that are also recited in the claim.

Agreement was reached with the Examiners that recitation of this step would overcome the § 101 rejection.

Claim 1 has also been rejected as anticipated by a 1995 paper of Dacorogna et al.

The Dacorogna 1995 paper mentions a decimal error filter at the top of page 15. It indicates at the bottom of page 14 that the filter detects "wrong decimal digits due to failed text updates." However, the Dacorogna paper does not indicate how the decimal error filter detects such wrong decimal digits. In the absence of any teaching in the Dacorogna paper of how to perform decimal error filtering, Dacorogna cannot anticipate applicants' claim 1.

As a general rule, a prior publication such as Dacorogna 1995 must contain a full enabling description to be an anticipation. Seymour v. Osborn, 78 U.S. (11 Wall) 516 (1870); Bristol-Myers Squibb Co. v. Ben Venue Laboratories, Inc., 246 F. 3d 1368, 1374, 58 USPQ 2d 1508 (Fed. Cir. 2001); Forest Laboratories, Inc. v. Ivax Pharmaceuticals, Inc., 84 USPQ 2d 1099, 1103 (Fed. Cir. 2007). Particularly on point is the observation in Elan Pharmaceuticals, Inc. v.

Mayo Foundation for Medical Education and Research, 346 F. 3d 1051, 68 USPQ 2d 1373, 1376 (Fed. Cir. 2003) that “The disclosure in an assertedly anticipating reference must be adequate to enable possession of the desired subject matter. It is insufficient to name or describe the desired subject matter, if it cannot be produced without undue experimentation.” Here, while Dacorogna 1995 names a decimal error filter at the top of page 15 of his paper and states that wrong decimal digits are a typical error for the case where data is transmitted in the form of text, Dacorogna 1995 does not describe how his decimal error filter works and does not otherwise describe the nature of the decimal error. In the absence of any further description, Dacorogna 1995 cannot be considered an enabling disclosure and does not anticipate independent claims 1 and 11 and the claims dependent thereon.

Dependent claims 2 through 10 are believed patentable for the same reasons claim 1 is patentable. The dependent claims are believed patentable for the additional reason that the references do not disclose the processes recited therein.

Claims 3-6 and 9 have been indicated to be allowable.

With respect to claim 2, it is respectfully submitted that Dacorogna 1995 does not disclose the step of detecting a monotonic series of quotes. As set forth in paragraph 0380, a monotonic series is one in which the magnitudes of all elements are successively increasing or successively decreasing. The statement in Dacorogna 1995 at page 16, second paragraph, that the elements of a time series are equally spaced in time is not a disclosure of a monotonic series. Agreement was reached with the Examiners on this point.

Claims 7 and 8 are believed patentable because Dacorogna does not disclose a process for testing for decimal error. As noted above, while Dacorogna mentions decimal error, he does not describe how he tests for it and he does not describe the specific tests enumerated in claims 7 and 8. Claims 7 and 8 have been amended as suggested by the Examiners to limit these claims to the case where the time series data is a series of quotes and to recite the step of detecting a decimal error in a quote.

Independent claim 11 recites a method of filtering time series data including the step of testing for decimal error. It is believed patentable because Dacorogna does not teach a process for testing for decimal error.

Dependent claims 12-19 are believed patentable for the same reasons claim 11 is patentable. Several of these claims are similar to dependent claims 2-10 and are believed patentable for those reasons as well.

Claims 14, 16 and 17 have been indicated to be allowable.

Claim 13 is believed patentable for the same reason claim 2 is patentable.

Claims 18 and 19 are believed patentable for the same reasons claims 7 and 8 are patentable.

Dependent claims 20-24 have been indicated to be allowable.

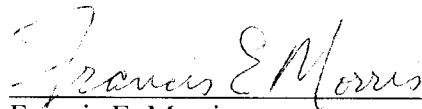
Dependent claims 25 and 26, which are dependent on claim 1, recite alternative steps for rejecting an item of data. Dependent claims 27 and 28 are the same as claims 25 and 26 but are dependent on claim 11. These claims are believed patentable for the same reasons claims 1 and 11 are patentable.

Aside from the fee for an extension of time, additional claims and an RCE, no additional fee is believed to be due for filing this response. However, if a fee is due, please charge such fee to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310.

If the Examiner believes a telephone interview would expedite prosecution of this application, she is invited to call applicant's attorney at the number given below.

Respectfully submitted,

Date: February 11, 2008

A handwritten signature in cursive script, reading "Francis E. Morris", is written over a horizontal line.

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